

IN THE CLAIMS

1. (Original) In a data communications device, a method for providing access to data from a data access device to a client over a network, the method comprising the steps of:
  - receiving a first request from a client to access data;
  - providing a second request to access data to the data access device in response to receiving the first request, the second request including connection establishment information that enables establishment of a communication connection between the data access device and the client;
  - receiving a first response from the data access device; and
  - providing a data transfer approval to the data access device in response to receiving the first response, the data transfer approval authorizing the data access device to establish the communication connection to the client based on the connection establishment information and provide a second response to the second request to the client.
2. (Original) The method of claim 1, wherein
  - the step of receiving the first request includes (i) receiving the first request based on a request/response communications protocol, and (ii) receiving a content identifier that identifies a requested content; and
  - the step of providing the second request includes providing the content identifier to enable the data access device to access the requested content.

3. (Original) The method of claim 1, wherein

the step of receiving the first request comprises receiving a plurality of first requests to access data from the client;

the step of providing the second request comprises providing a plurality of second requests in response to receiving the first requests, each second request including a request sequence number; and

the step of providing the data transfer approval comprises providing a data transfer approval for each of a plurality of responses to the second requests in a sequence based on the request sequence numbers for the second requests.

4. (Original) The method of claim 1, wherein

the step of providing the second request comprises providing a plurality of second requests to a plurality of data access devices;

the step of receiving the first response comprises receiving a plurality of first responses from a subset of the plurality of data access devices that received the second requests; and

the step of providing the data transfer approval comprises a step of selecting one of the subset of data access devices to provide the second response to the second request and providing the data transfer approval to the selected one of the data access devices.

5. (Original) The method of claim 4, wherein each first response includes usage information for each data access device in the subset that indicates a level of usage for each data access device in the subset; and

the step of selecting one of the subset comprises comparing the usage information for all of the data access devices in the subset to determine the selected one of the data access devices from the subset having a preferable level of usage.

6. (Original) The method of claim 1, wherein the connection establishment information includes a current transmit window for the client that provides a window length for transmitting the second response to the client from the data access device, the window length provided by the client in the first request for use by the data access device when determining a quantity of data to provide in the second response.
7. (Original) The method of claim 1, wherein the data access device is a first data access device, and the connection establishment information includes a location identifier for a second data access device suitable for use if a requested content specified in the first request is unavailable from the first data access device.
8. (Original) The method of claim 1, wherein the connection establishment information is a first set of connection establishment information, and the data transfer approval includes a second set of connection establishment information, the data transfer approval authorizing the data access device to establish the communication connection to the client based on the first set and the second set of connection establishment information.
9. (Original) The method of claim 1, further comprising the steps of:
  - receiving a first acknowledgment from the client of the second response provided to the client from the data access device over the communication connection; and
  - in response to receiving the first acknowledgment, forwarding a second acknowledgment to the data access device indicating that the data communications device received the first acknowledgment from the client.

10. (Original) The method of claim 1, further comprising the steps of:

receiving a first termination signal from the data access device in order to terminate a request session with the client; and  
in response to receiving the first termination signal, providing a second termination signal to the client that indicates a request to terminate the request session.

11. (Original) A data communications device for providing access to data from a data access device to a client over a network, the data communications device comprising:

a processor;  
a memory coupled to the processor; and  
a communications interface connected to the processor and the memory:

wherein the memory is encoded with logic instructions for a data communication manager application that, when performed on the processor, cause the processor to form a data communication manager that manages the access to data stored in the data access device by performing the operations of:

receiving a first request through the communications interface from a client to access data;  
providing a second request to access data through the communications interface to the data access device in response to receiving the first request, the second request including connection establishment information that enables establishment of a communication connection between the data access device and the client;  
receiving a first response through the communications interface from the data access device; and  
providing a data transfer approval through the

communications interface to the data access device in response to receiving the first response, the data transfer approval authorizing the data access device to establish the communication connection through the communications interface to the client based on the connection establishment information and provide a second response to the second request to the client.

12. (Original) The data communications device of claim 11, wherein the logic instructions for the data communication manager application comprise further logic instructions that, when performed on the processor, cause the data communication manager to perform the operations of:
  - receiving the first request based on a request/response communications protocol,
  - receiving a content identifier that identifies a requested content; and
  - providing the content identifier to enable the data access device to access the requested content.
  
13. (Original) The data communications device of claim 11, wherein the logic instructions for the data communication manager application comprise further logic instructions that, when performed on the processor, cause the data communication manager to perform the operations of:
  - receiving a plurality of first requests to access data from the client;
  - providing a plurality of second requests in response to receiving the first requests, each second request including a request sequence number; and
  - providing a data transfer approval for each of a plurality of responses to the second requests in a sequence based on the request sequence numbers for the second requests.

14. (Original) The data communications device of claim 11, wherein the logic instructions for the data communication manager application comprise further logic instructions that, when performed on the processor, cause the data communication manager to perform the operations of:
  - providing a plurality of second requests to a plurality of data access devices;
  - receiving a plurality of first responses from a subset of the plurality of data access devices that received the second requests; and
  - selecting one of the subset of data access devices to provide the second response to the second request and providing the data transfer approval to the selected one of the data access devices.
15. (Original) The data communications device of claim 14, wherein each first response includes usage information for each data access device in the subset that indicates a level of usage for each data access device in the subset; and
  - wherein the logic instructions for the data communication manager application comprise further logic instructions that, when performed on the processor, cause the data communication manager to perform the operation of comparing the usage information for all of the data access devices in the subset to determine the selected one of the data access devices from the subset having a preferable level of usage.
16. (Original) The data communications device of claim 11, wherein the connection establishment information includes a current transmit window for the client that provides a window length for transmitting the second response to the client from the data access device, the window length provided by the client in the first request for use by the data access device when determining a quantity of data to provide in the second response.

17. (Original) The data communications device of claim 11, wherein the data access device is a first data access device, and the connection establishment information includes a location identifier for a second data access device suitable for use if a requested content specified in the first request is unavailable from the first data access device.
18. (Original) The data communications device of claim 11, wherein the connection establishment information is a first set of connection establishment information, and the data transfer approval includes a second set of connection establishment information, the data transfer approval authorizing the data access device to establish the communication connection to the client based on the first set and the second set of connection establishment information.
19. (Original) The data communications device of claim 11, wherein the logic instructions for the data communication manager application comprise further logic instructions that, when performed on the processor, cause the data communication manager to perform the operations of:
  - receiving a first acknowledgment through the communications interface from the client of the second response provided to the client from the data access device over the communication connection; and
  - in response to receiving the first acknowledgment, forwarding a second acknowledgment through the communications interface to the data access device indicating that the data communications device received the first acknowledgment from the client.

20. (Previously Presented) The data communications device of claim 11, wherein the logic instructions for the data communication manager application comprise further logic instructions that, when performed on the processor, cause the data communication manager to perform the operations of:

receiving a first termination signal through the communications interface from the data access device in order to terminate a request session with the client; and

in response to receiving the first termination signal, providing a second termination signal through the communications interface to the client that indicates a request to terminate the request session.

21. (Original) A computer program product that includes a computer readable medium having instructions stored thereon for providing access to data from a data access device to a client over a network, such that the instructions, when carried out by a data communications device, cause the data communications device to perform the steps of:

receiving a first request from a client to access data;

providing a second request to access data to the data access device in response to receiving the first request, the second request including connection establishment information that enables establishment of a communication connection between the data access device and the client,

receiving a first response from the data access device; and

providing a data transfer approval to the data access device in response to receiving the first response, the data transfer approval authorizing the data access device to establish the communication connection to the client based on the connection establishment information and provide a second response to the second request to the client.

22. (Original) A data communications device for providing access to data from a data access device to a client over a network, the data communications device comprising:

means for receiving a first request from a client to access data;

means for providing a second request to access data to the data access device in response to receiving the first request, the second request including connection establishment information that enables establishment of a communication connection between the data access device and the client,

means for receiving a first response from the data access device; and

means for providing a data transfer approval to the data access device in response to receiving the first response, the data transfer approval authorizing the data access device to establish the communication connection to the client based on the connection establishment information and provide a second response to the second request to the client.

23. (Original) In a data access device, a method for providing data over a network to a client, the method comprising the steps of:

receiving a second request to access data from a data communications device, the second request based on a first request to access data received by the data communications device from the client and the second request including connection establishment information that enables establishment of a communications connection between the data access device and the client;

providing a first response to the data communications device; and receiving a data transfer approval from the data communications

device in response to providing the first response, the data transfer approval authorizing the data access device to establish the communication connection to the client and to provide a second response to the second request to the client based on the connection establishment information.

24. (Original) The method of claim 23, wherein the step of receiving the second request includes receiving a content identifier that identifies a requested content and that enables the data access device to access the requested content.

25. (Original) The method of claim 23, wherein the connection establishment information includes a current transmit window for the client that provides a window length for transmitting the second response to the client, the window length provided by the client in the first request for use by the data access device when determining a quantity of data to provide in the second response.

26. (Original) The method of claim 23, wherein the data access device is a first data access device, and the connection establishment information includes a location identifier for a second data access device suitable for use if a requested content specified in the first request is unavailable from the first data access device.

27. (Original) The method of claim 23, wherein the connection establishment information is a first set of connection establishment information, and the data transfer approval includes a second set of connection establishment information, the data transfer approval authorizing the data access device to establish the communication connection to the client based on the first set and the second set of connection establishment information.

28. (Original) The method of claim 23, further comprising the steps of establishing the communication connection to the client and providing the second response to the second request to the client over the communication connection.

29. (Original) A data access device for providing data to a client, the data access device comprising:

- a processor;
- a memory coupled to the processor; and
- a communications interface connected to the processor and the memory;

wherein the memory is encoded with logic instructions for a data access manager application that, when performed on the processor, cause the processor to form a data access manager that provides data to the client by performing the operations of:

- receiving a second request to access data through the communications interface from a data communications device, the second request based on a first request to access data received by the data communications device from the client and the second request including connection establishment information that enables establishment of a communications connection between the data access device and the client;
- providing a first response through the communications interface to the data communications device; and
- receiving a data transfer approval through the communications interface from the data communications device in response to providing the first response, the data transfer approval authorizing the data access device to establish the communication connection through the communications interface to the client and

to provide a second response to the second request to the client based on the connection establishment information.

30. (Original) The data access device of claim 29, wherein the logic instructions for the data access manager application comprise further logic instructions that, when performed on the processor, cause the data access manager to perform the operation of receiving a content identifier that identifies a requested content and that enables the data access device to access the requested content.
31. (Original) The data access device of claim 29, wherein the connection establishment information includes a current transmit window for the client that provides a window length for transmitting the second response to the client, the window length provided by the client in the first request for use by the data access device when determining a quantity of data to provide in the second response.
32. (Original) The data access device of claim 29, wherein the data access device is a first data access device, and the connection establishment information includes a location identifier for a second data access device suitable for use if a requested content specified in the first request is unavailable from the first data access device.
33. (Original) The data access device of claim 29, wherein the connection establishment information is a first set of connection establishment information, and the data transfer approval includes a second set of connection establishment information, the data transfer approval authorizing the data access device to establish the communication connection to the client based on the first set and the second set of connection establishment information.

34. (Original) The data access device of claim 29, wherein the logic instructions for the data access manager application comprise further logic instructions that, when performed on the processor, cause the data access manager to perform the operations of establishing the communication connection through the communications interface to the client and providing the second response to the second request to the client over the communication connection.

35. (Original) A computer program product that includes a computer readable medium having instructions stored thereon for providing data over a network to a client, such that the instructions, when carried out by a data access device cause the data access device to perform the steps of:

- receiving a second request to access data from a data communications device, the second request based on a first request to access data received by the data communications device from the client and the second request including connection establishment information that enables establishment of a communications connection between the data access device and the client;
- providing a first response to the data communications device; and
- receiving a data transfer approval from the data communications device in response to providing the first response, the data transfer approval authorizing the data access device to establish the communication connection to the client and to provide a second response to the second request to the client based on the connection establishment information.

36. (Original) A data access device for providing data to a client, the data access device comprising:

means for receiving a second request to access data from a data communications device, the second request based on a first request to access data received by the data communications device from the client and the second request including connection establishment information that enables establishment of a communications connection between the data access device and the client;

means for providing a first response to the data communications device; and

means for receiving a data transfer approval from the data communications device in response to providing the first response, the data transfer approval authorizing the data access device to establish the communication connection to the client and to provide a second response to the second request to the client based on the connection establishment information.

37. (Previously Presented) A method as in claim 1, wherein the data communication device is a switch and wherein providing the data transfer approval to the data access device results in the data access device establishing the communication connection with the client to service the first request, the communication connection being a path other than through the data communication device.

38. (Previously Presented) A method as in claim 37, wherein providing the second request includes originating the connection establishment information to include an address of the client, the address being used by the data access device to establish the communication connection directly with the client to provide requested content from the data access device to the client, alleviating the data communication device from having to facilitate a transfer of data from the data access device to the client to service the first request.

39. (Previously Presented) A method as in claim 38, wherein the first request is one of multiple requests by the client to the data communication device, the method further comprising:

providing a sequence number associated with the second request to enable the data access device to reply to the second request according to an order associated with when the second request was made relative to the multiple requests to the data communication device so that the client does not need to wait for fulfillment of a previous request before sending of the first request.

40. (Previously Presented) A method as in claim 38 further comprising:

performing a bidding process with multiple data access devices; receiving responses from the multiple data access devices including load information and estimates of a cost of servicing the first request; and

based on the load information, selecting the data access device of multiple data access devices to service the first request by sending the second request to the data access device.

41. (Previously Presented) A method as in claim 23, wherein the data communication device is a switch and wherein receiving the data transfer approval results in the data access device establishing the communication connection with the client to service the first request, the communication connection from the data access device to the client being a path other than through the data communication device.

42. (Previously Presented) A method as in claim 41, wherein receiving the second request includes receiving an address of the client, the address being used by the data access device to establish the communication connection directly with the client to provide requested content from the

data access device to the client, alleviating the data communication device from having to facilitate a transfer of data from the data access device to the client to service the first request.

43. (Previously Presented) A method as in claim 42, wherein the first request is one of multiple requests by the client to the data communication device, the method further comprising:  
receiving a sequence number associated with the second request to enable the data access device to reply to the second request according to an order associated with when the second request was made relative to the multiple requests to the data communication device so that the client does not need to wait for fulfillment of a previous request before sending of the first request.
44. (New) A method as in claim 43, wherein receiving the first response from the data access device includes receiving an indication from the data access device that the data access device has access to the data and can forward the data to the client
45. (New) The data communications device of claim 13, wherein a respective sequence number for each of the second requests distinguishes the second requests amongst each other such that a first one of the second requests has a corresponding assigned unique sequence number with respect to a corresponding assigned sequence number assigned to a second one of the second requests.
46. (New) The data communications device of claim 15, wherein the plurality of second requests are forwarded to the plurality of data access devices in response to receiving a single first request from the client such that the data communication device learns, based on receiving the first responses,

which of the data communications devices are most able to service the first request by forwarding data to the client.

47. (New) The data communication device as in claim 11, wherein the data communication device is a switch and wherein receiving the data transfer approval results in the data access device establishing the communication connection with the client to service the first request, the communication connection from the data access device to the client being a path other than through the data communication device; and  
wherein the connection establishment information in the second request includes a request for content generated by the client, the data access device receiving the request for content prior to establishing a connection between the data access device and the client based on the connection establishment information.
48. (New) The data communication device as in claim 47, wherein the client generates multiple first requests for corresponding different content, the multiple first requests being forwarded from the client to the data communication device, the data communication device generating respective second requests associated with each of the multiple first requests, the data communication device forwarding the respective second requests to two or more data access devices that are able to establish a respective connection and serve requested data, each of the second requests sent from the data communication device to a respective data access device including a request sequence number distinguishing each of the second requests from each other.
- 49 (New) The data communication device as in claim 48, wherein if the client makes several pipelined first requests to the data communication device, the data communication device then uses the request sequence numbers

to determine when and to which data access device to send respective second requests so that the client can receive a respective response from the data access device in an order corresponding to an order of the first requests forwarded from the client to the data communication device.

50. (New) The data communications device of claim 11, wherein the connection establishment information includes a current transmit window for the client that provides a window length for transmitting the second response to the client from the data access device, the window length provided by the client in the first request for use by the data access device when determining a quantity of data to provide in the second response; wherein the data access device is a first data access device, and the connection establishment information includes a location identifier for a second data access device suitable for use if a requested content specified in the first request is unavailable from the first data access device; wherein the connection establishment information is a first set of connection establishment information, and the data transfer approval includes a second set of connection establishment information, the data transfer approval authorizing the data access device to establish the communication connection to the client based on the first set and the second set of connection establishment information; and wherein the logic instructions for the data communication manager application comprise further logic instructions that, when performed on the processor, cause the data communication manager to perform the operations of:
  - receiving a first acknowledgment through the communications interface from the client of the second response provided to the client from the data access device over the communication connection; and

in response to receiving the first acknowledgment, forwarding a second acknowledgment through the communications interface to the data access device indicating that the data communications device received the first acknowledgment from the client;

wherein the logic instructions for the data communication manager application comprise further logic instructions that, when performed on the processor, cause the data communication manager to perform the operations of:

receiving a plurality of first requests to access data from the client;

providing a plurality of second requests in response to receiving the first requests, each second request including a request sequence number; and

providing a data transfer approval for each of a plurality of responses to the second requests in a sequence based on the request sequence numbers for the second requests.